

Real education should educate us out of self into something far finer;
into a selflessness which links us with all humanity.
Nancy Astor (1879–1964)

CHILDREN'S HEALTH

The Opposite of Obesity: Undernutrition Overwhelms the World's Children

An alarming number of studies report that overnutrition and the resulting obesity are a growing health problem for children in industrialized nations and even some developing ones. The explosion of such studies might seem to suggest that starvation is a thing of the past, yet children in many developing countries still go hungry. Furthermore, a lack of calories and nutrients—or undernutrition—can worsen the effects of infectious disease, and thereby causes half of all child deaths worldwide, report public health experts at The Johns Hopkins University and the World Health Organization in the 1 July 2004 issue of the *American Journal of Clinical Nutrition*.

This new finding supports a 1995 study coordinated by David Pelletier, an associate professor of nutrition sciences at Cornell University, which provided the first evidence of how often child deaths are attributable to undernutrition. The latest study goes a step further: Johns Hopkins nutritionist Laura Caulfield and her colleagues answer the important question of whether undernutrition exacerbates the effects of infectious diseases.

Caulfield headed a team that analyzed data from 10 large studies of child deaths in sub-Saharan Africa and Southeast Asia. These studies included data about the average weight-for-age status of children relative to healthy U.S. reference children. Unlike Pelletier's work, the studies reviewed by Caulfield's team contained information about the cause of death, allowing the team to tease out the role of undernutrition in deaths caused by diarrhea, malaria, measles, and pneumonia.

Weight-for-age is the most widely used indicator of child

nutritional status in developing countries. Caulfield's team compared the weight-for-age of children relative to the "international growth reference" established by the National Center for Health Statistics. Children who fall below -2 standard deviations are classified as moderately to severely undernourished (in developing countries, 30–50% of children fall into this category). The team then used a statistical model to relate weight-for-age scores to the death rate.

Overall, the team found having a low weight-for-age score is a leading risk factor for child deaths, accounting for 52.5% worldwide. Among individual diseases studied, undernutrition is responsible for 60.7% of deaths from diarrhea, 57.3% of deaths from malaria, 52.3% of deaths from pneumonia, and 44.8% of deaths from measles.

Moreover, children do not need to be severely undernourished to be at heightened risk of dying if an infectious disease

strikes. "Our analysis shows that even children who are small [for their age], but who would not be classified as malnourished based on their weight, are twice as likely to die as children of normal weight," says Caulfield. "Undernutrition increases the susceptibility to illness and increases the likelihood that an illness will be severe."

Before Caulfield's study and the earlier one by Pelletier, experts estimated that undernutrition accounted for no more than 5% of child deaths; cause of death was attributed only to obvious disease symptoms, such as diarrhea or fever. These earlier estimates "did not capture the underlying effect of malnutrition in making a disease more severe," says Pelletier, who calls undernutrition "the silent killer."

Public health experts and policy makers historically look to immunizations, drug treatments, and sanitation as ways to prevent child deaths. Programs such as the Millennium Development Goals of the United Nations (which promises to cut the mortality rate of children under age 5 by two-thirds by the year 2015) and vaccination accessibility and research projects funded by the Bill & Melinda Gates Foundation suggest that the international community is committed to improving child health through such means.

But disease treatment and prevention are not enough, says Pelletier; money must also go toward educational and agricultural programs to abate undernutrition. "The impact of undernutrition is not as well appreciated," agrees Caulfield. Her findings emphasize the need to invest in nutrition programs globally to reduce child deaths.

The new findings are a wake-up call to policy makers about the implications of undernutrition. "The data are there," says Caulfield, "but we need to translate them for policy makers so that they can understand what it means for a child to weigh less than normal." In addition to preventing child deaths, correcting undernutrition contributes to quality of life. Even if antibiotics and immunizations keep children alive, "their quality of life is miserable if they're malnourished," says Pelletier. —Carol Potera



Hunger persists. A severely malnourished 4-year-old in Ethiopia is typical of thousands of children around the world whose health and lives are devastated by lack of adequate food.

Sven Torfinn/Panos Pictures

LEAD

Sweet Candy, Bitter Poison

For years, scientists and health experts have traced child lead exposures to paint, leaded gasoline, soils, dust, lead-soldered cans and water pipes, and lead-glazed pottery. More recently, tests have shown that something as presumably innocuous as candies—specifically certain ones made in Mexico—may also be a source of toxic lead. Efforts are under way to combat this source of exposure, but success to date has varied.

Lead poisoning causes a host of problems, many worse in children, including decreased intelligence, impaired neurobehavioral development, stunted physical growth, hearing impairment, and kidney problems. Blood lead levels as low as 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$) are known to cause adverse health effects. The U.S. Food and Drug Administration (FDA) recommends that children under age 6 consume less than 6.0 μg lead daily from all food sources.

Since the early 1990s, the FDA, the California Department of Health Services, and independent laboratories have shown that certain Mexican candies contain sometimes hazardous levels of lead. Historically, some Mexican candy manufacturers have had two versions of their product lines: a cleaner version that meets FDA standards and is designed for export to the United States, and a dirtier—and cheaper—version for the Mexican market. The latter is imported via the “grey market”—pickup trucks that drive shipments over the border to small, family-owned stores, particularly in California, Texas, New Mexico, and Arizona. These stores serve local Latinos, who enjoy the comfort and familiarity of candy from home.

The huge number of these small, informal shipments makes surveillance very difficult. Yet according to the San Diego-based nonprofit Environmental Health Coalition, California has traced 15% of its child lead poisoning cases to lead-contaminated candy—roughly the same percentage attributed to lead-based paint.

Lead-glazed clay pots and candy wrappers printed with lead-based ink were the focus of the FDA's earliest tests. Tamarind candy packaged in lead-glazed pots elevated blood lead levels in some children to

40–50 $\mu\text{g}/\text{dL}$. And in May 2001, the FDA cautioned consumers to stay away from tamarind Bolirindo lollipops. Tests had found lead concentrations of 21,000 parts per million (ppm) in the lollipops' wrappers.

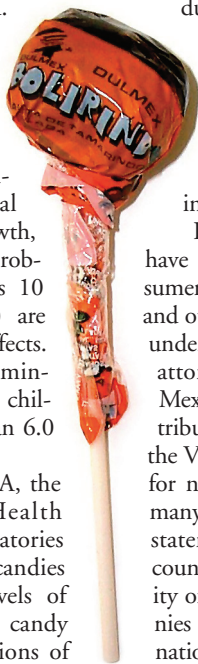
California and FDA officials have also found lead in a common ingredient in many Mexican candies—chili powder. Several potential contamination sources have been suggested: soil residue from fields, air-drying or storage where the chilies can accumulate dust from exhaust emissions, metal particles accumulated during the grinding process, and drying over open petrochemical fires.

One chili-coated candy tested by the FDA, Chaca Chaca, contained as much as 0.3–0.4 μg lead per gram of product, with one piece of candy alone weighing 35 grams.

Public health and advocacy groups have had some success in warning consumers about lead-contaminated candy, and other efforts to solve the problem are under way. In July 2004, California attorney general Bill Lockyer sued Mexican candy manufacturers and distributors, including two subsidiaries of the Virginia-based Mars candy company, for neglecting to advise consumers that many of their products contain lead. A statement issued by the defendants' counsel downplayed the extent and gravity of the problem, insisting the companies complied fully with U.S. and international food safety laws. “Traces of minerals such as lead are . . . found in virtually all foods, including fish, meats, grains, fruits and vegetables, and candy,” the statement read. “People have been eating those foods safely for generations.”

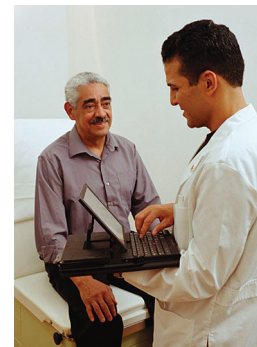
Earlier in the summer, California assemblyman Marco Firebaugh proposed a bill that would have banned candies containing more than 0.2 ppm. But the bill died on the floor in August, in large part because other law makers felt the 0.2-ppm safety margin could undermine the Lockyer lawsuit.

The FDA continues to work with the Mexican government to identify the agricultural and manufacturing practices that cause the contamination, although Mexico largely does not have the analytical support, laboratories, and instrumentation to carry out the necessary product testing. Because this contamination appears to be avoidable, the FDA is proposing to lower the amount of lead allowed in candy products and ingredients in the near future. —Jennifer Medlin



e-Hospitals for Better Care

In July 2004 DHHS secretary Tommy Thompson announced a 10-year plan to improve the delivery of health care across the nation using electronic health records. The plan—initiated by President Bush in April—calls for continuously updated and accessible electronic health records, which can give physicians life-saving information in real time. A recent Institute of Medicine report found that implementation of electronic medical record systems could reduce the tens of thousands of deaths and injuries caused by medical mistakes each year. Bush has called for electronic medical records for most Americans within 10 years. A panel appointed by Thompson should provide a full cost-benefit analysis of health information technology this fall.



WHO Launches Children's Health Resources

The World Health Organization has unveiled several new resources on children's environmental health. An “e-library” CD-ROM contains more than 100 documents concerning children's environmental health. *Children's Health and the Environment: A Global Perspective* is a reference manual for health care providers and policy makers that includes case studies of environmental illnesses, tips on taking pediatric environmental histories, and ways people can take action to improve children's health. And the *Atlas of Children's Environmental Health and the Environment* is a compendium of facts on environmental hazards to children. These resources are intended to underscore for stakeholders how greatly children are impacted by the environment. It is estimated that over 40% of the environment-related disease burden falls on children under the age of 5, with over 3 million children dying from environmental causes each year.

Tragic Trinkets

The Consumer Product Safety Commission issued a record-breaking recall in July 2004 when it announced that 150 million toy bracelets, rings, and necklaces should be removed from the market or discarded by parents because they contain high levels of lead. The vending machine trinkets had already been recalled twice before during the preceding year, but the problem persisted. Tests have found that some of the items, which are made in India, contain as much as 69% lead by weight. The four importers of the jewelry have agreed to the recall, while the commission has posted photos of the items on the website <http://www.toyjewelryrecall.com>.



RECYCLING

Funds for Phones

Americans will retire about 100 million cell phones this year when they switch to new models or new carriers, according to INFORM, a nonprofit environmental research group. Many go into the trash, ending up in landfills, and still more are tossed into closets and drawers, where they await the same ultimate destination. As University of Florida researchers concluded in the July 2004 report *RCRA Toxicity Characterization of Computer CPUs and Other Discarded Electronic Devices*, cell phones often release enough lead under test conditions to be classified as hazardous waste under federal law [see "Electronics, Lead, and Landfills," *EHP* 112:A734 (2004)]. But while this growing mountain of old phones is drawing the attention of people who are worried about its potential impact on the environment, it has also been discovered by people who see it as a commodity that still retains market value.

In recent years, companies have emerged that buy old cell phones from individuals or groups that collect them on fundraising

drives. These companies then sell the phones to foreign wireless carriers, who refurbish and resell them, or recyclers, who extract metals such as gold, silver, and copper. One company, RMS Communications Group, is currently taking in about 80,000 phones per month, according to its marketing and communications manager, Lynda Gorsuch. Like many such companies, RMS emphasizes charity tie-ins, offering people the opportunity to make a "virtual contribution" of the dollar value of the phone they sent in to a variety of charities listed on the RMS websites <http://www.cellforcash.com/> and <http://www.wirelessfundraiser.com/>. Another such firm is CollectiveGood (<http://www.collectivegood.com/>), which offers a similar smorgasbord of charities to which people can contribute the value of their old phones.

Meanwhile, youth organizations have found that cell phone collection drives offer unparalleled fundraising opportunities. On Earth Day 2004, a group of Boy Scouts in West Jordan, Utah, collected cell phones that they sold to RMS. RMS paid the Scouts from a set price list ranging from \$3 to \$100 per phone. The public response was so

overwhelming that the Scouts are continuing the program and expect to make \$6,000 from it this year, says David Bresnahan, an adult advisor who set up the project.

"We're trying to promote environmental protection, which is a great lesson for the kids," Bresnahan says, "and we're putting the money into a fund that's used to help kids who can't afford to go to camp or can't afford a backpack."

A 2003 INFORM report, *Calling All Cell Phones*, analyzed various U.S. cell phone collection and recycling programs and concluded that, while they are providing a "critically important" service, they are not nearly enough. INFORM senior researcher Bette Fishbein says industry programs will absorb about 1% of this year's discarded phones, and independent programs such as RMS and CollectiveGood will absorb a bit more. But the total amount of phones being taken in is still well under 5% of the 100 million that will be discarded, she says.

"It's a step in the right direction," Fishbein concludes. "But if you're going to address the issue of toxics entering our environment through disposal facilities, you've got to take back a lot more." —Richard Dahl

AGRICULTURE

Farm Chore Checkup

Nearly 23,000 children are hurt doing farmwork in the United States each year, and approximately 100 children are killed, according to the National Agricultural Statistics Service. To combat this problem, the National Children's Center for Rural and Agricultural Health and Safety in Marshfield, Wisconsin, developed the North American Guidelines for Children's Agricultural Tasks (NAGCAT) in the late 1990s to help farm parents assess whether their children aged 7–16 are developmentally ready to safely complete various farm tasks. A recent study now offers evidence that NAGCAT has been effective at preventing injuries to children working on farms.

The study was led by pediatric scientist Anne Gadowski of the Bassett Research Institute in Cooperstown, New York, and published in the October 2004 *American Journal of Public Health*. It is the first randomized, controlled trial to test the efficacy of these guidelines in preventing farm injuries.

William Pickett, a researcher on agricultural injury at Queens University in Kingston, Ontario, says many interventions are directed at children, which may not be an effective strategy. "You can have the most highly educated, most informed child around," he says, "but they are not necessarily the ones making the decisions about what they do on the farm and where they are allowed to go."

NAGCAT, on the other hand, provides guidance for those who do make such decisions. The guidelines are conveyed through a professional resource manual and parent booklets. Each booklet covers



a set of related farm tasks, such as animal care or tractor work, using a poster format to describe the task, adult responsibilities, potential hazards, and necessary safety precautions. The posters also list developmental abilities a child must possess to perform the task.

The study involved 2,454 children on 845 farms in central New York. Some of the farms received NAGCAT information, while others did not. Over 21 months, the researchers collected data on children's injuries, what they were doing when injured, their general responsibilities, and the number of hours worked.

Although the two groups did not differ significantly in overall injury incidence, farms that received NAGCAT information reported fewer injuries related to tasks described in the guidelines. Gadowski says, "We suspect that the average age of

the child is going up in terms of being assigned certain tasks now that the parent has a guideline to help them make that assessment. The other issue is [parents now have] some idea of how much supervision certain aged children require in order to do the job safely." For the most part, children under 7 are not ready to engage in productive agricultural work, says Nancy Esser, an agricultural youth safety specialist at the center. The center therefore recommends that young children not be involved in such work.

The study is a welcome addition to the literature in an area where there are few published trials, says Pickett. But NAGCAT addresses only one portion of the pediatric farm injury problem, he says. Similar efforts are needed to address injuries that occur among young children—not necessarily workers—who accompany their worker parents into the farm environment. —Julia R. Barrett

NIEHS Environmental Health Science Education

Although the NIEHS is known primarily as a research institution, the institute is also charged with making its findings openly accessible to the public. As one of its efforts in this area, the NIEHS has developed its Environmental Health Science Education website to provide teaching materials for students and educators on topics including asthma, carcinogens, herbal medicines, nanotechnology, obesity, and risk assessment. To aid in the ease of finding materials, the site's homepage, located at <http://www.niehs.nih.gov/science-education/home.htm>, has three portals, one for each of the three audiences—students, teachers, and scientists—that may be accessing the site.

The Students portion contains a library of homework resources, sorted by type of publication: factsheet, pamphlet, news article, or video. The page shows the ages for which each resource is intended. Within the Online Activities subsection are links to games, puzzles, tips for healthy living, environment-related coloring books, and storybooks. Most of these activities are intended for elementary or middle school students, although there is one tool, Project Greenskate, that has been developed for high school students. The Students portion also contains information on summer employment and training opportunities for high school and college students.

In the Teachers portion of the site, educators can find curricular materials, sorted by keywords, that include a real-time air quality activity, guides to performing scientific techniques such as the Ames assay, classroom role-playing scenarios such as the Hydroville Challenge project, and staff development units. Also within the curricular materials section are links to PDF presentations, web-based activities, and videos. Teachers can access lesson resources such as pamphlets and other print materials. Under the Professional Development subsection of the Teachers portion are links to the NIEHS Summers of Discovery program and other teacher training programs around the country.

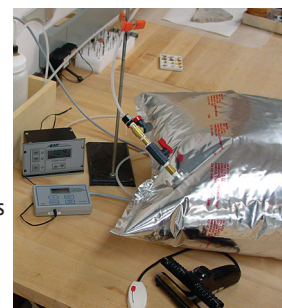
The Scientists portion of the site, meanwhile, offers resources that environmental health professionals can use in making classroom presentations on subjects related to their work. The resources are annotated with the subject, format, and intended audience. Also within this section is a Professional Opportunities page, which links to EHP's online Career Opportunities and Fellowships listings, as well as training, fellowship, and career development opportunities through the NIEHS Division of Extramural Research and Training.

All of the materials on the website are fully searchable from the homepage. There is also a menu bar across the top of the homepage to quickly access the most often requested pages. Visitors can find information on how to schedule tours to the NIEHS campus in Research Triangle Park, North Carolina, and how to request classroom visits by NIEHS scientists. A number of the resources available on the site are also available in Spanish. These can be accessed through a link on the top menu bar. —Erin E. Dooley



Preservation Masterpiece

Ozone-depleting methyl bromide was once the fumigant of choice for protecting museum artifacts against insects and mold. But with the chemical's scheduled phase-out in January 2005, an alternative is gaining ground in museums around the world. The new method uses commercially available oxygen absorbers and airtight bags to kill pests by depriving them of oxygen. The technology was first developed by NASA to prevent rusting, and was first used for artifact preservation in the early 1990s in two California museums. Today it is being used in North America, Australia, Europe, Latin America, and Japan. Recently the director of Japan's Maritime Self-Defense Force Sasebo Historical Museum reported that the museum had preserved more than 3,000 artifacts with the method and that all remain in good condition.



European Child Health Plan Adopted

In June 2004, the Fourth Ministerial Conference on Environment and Health adopted the Children's Environment and Health Action Plan for Europe. The plan includes regional priority goals for ensuring children's access to safe drinking water and adequate sanitation, reducing accidental deaths and injuries, promoting child-friendly urban planning, reducing respiratory disease, and reducing exposure to hazardous chemicals. The plan calls on the represented nations to implement national children's environmental health plans by 2007. The meeting also sponsored a young journalists workshop and a youth parliament as part of the European Commission's efforts to enlist young people as environmental stakeholders.

A Vaccine for Medical Waste Burning

The NGO Health Care Without Harm has teamed with the Philippines Department of Health to prove large-scale immunizations can be conducted without the burning of medical waste. Incineration of syringes, needles, and other medical waste releases toxicants such as dioxin, mercury, and lead into the air. During the program, conducted during February 2004, about 18 million Filipino children were vaccinated for measles using an estimated 19.5 million syringes. The used syringes were collected in safety boxes and treated in either autoclave or microwave facilities, then buried in waste pits or put in concrete vaults. In 1999 the Philippines was the first nation to ban the burning of all waste, including medical waste.

